

ABSTRACT

[00273] A method of optimizing a mechanical cardiac pumping device includes modeling the circulatory system of the patient who will receive the mechanical cardiac pumping device and identifying an operating condition of the native heart to which the device will respond. The model is used to determine the required blood volume to be ejected from the device and an initial estimate of the power required to be provided to the mechanical cardiac pumping device is provided in order to provide the required ejected blood volume. The resultant ejected blood volume is evaluated with data obtained from the model and the estimate of the power requirement is then updated. The above steps are iteratively performed until the power required to obtain the necessary ejected blood volume is identified. Possible variations of power and pumping rate that allow the mechanical cardiac pumping device to provide the required volume are determined and the variation that best matches the physiological constraints of the patient and minimizes the power required by the mechanical cardiac pumping device is selected. The steps are iteratively performed until the mechanical cardiac pumping device is optimized to respond to each desired operating condition of the native heart.